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Referencia : Expediente No. 09.023.356
Asunto : Solicitud para patente de invención PCT para
MÉTODO PARA LA PROTECCIÓN DE
CULTIVOS FRENTE A
DESCOMPOSICIÓN MICROBIANA POST
COSECHA
Solicitante : **PLANT PROTECTANTS, LLC**
Fecha de solicitud : 6 de marzo de 2007

Yo, **Ernesto Cavelier Franco**, identificado como aparece al pie de mi firma, actuando como apoderado de la sociedad en el asunto antes identificado y encontrándome dentro del término legal establecido para tal efecto, anexo a la presente:

- 1) Copia certificada de la solicitud de la patente No. 61/034,881 de la cual se reivindica prioridad en el asunto de la referencia, junto con la traducción simple al idioma español de la caratula y el pliego reivindicatorio.

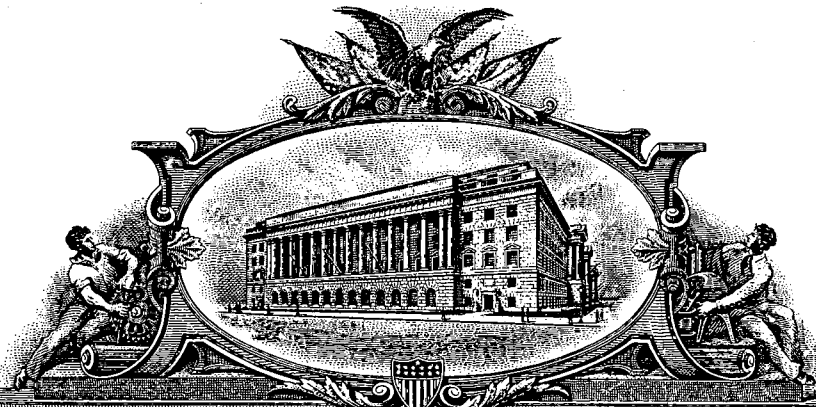
De la Señora Jefe,

Ernesto Cavelier

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C.C. 19.081.620 de Bogotá.
T.P. 11519

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March 16, 2009

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APPLICATION NUMBER: 61/034,881

FILING DATE: March 07, 2008

THE COUNTRY CODE AND NUMBER OF YOUR PRIORITY APPLICATION, TO BE USED FOR FILING ABROAD UNDER THE PARIS CONVENTION, IS US61/034,881

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P. R. GRANT
Certifying Officer

Electronic Acknowledgement Receipt

EFS ID:	2969002
Application Number:	61034881
International Application Number:	
Confirmation Number:	7983
Title of Invention:	Post Harvest Treatment of Fruit
First Named Inventor/Applicant Name:	Nigel M Grech
Customer Number:	25265
Filer:	Mark Daryl Miller
Filer Authorized By:	
Attorney Docket Number:	10922.00
Receipt Date:	07-MAR-2008
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Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)
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1	Provisional Cover Sheet (SB16)	ProvisionalSB.pdf	699865	no	3
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Warnings:

Information:

2	Specification	provisionalSPEC.pdf	2105097	no	13
			64556e21a9e5161169a2e10f9941bc9e94474e5d		

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Information:

3	Fee Worksheet (PTO-06)	fee-info.pdf	8095	no	2
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Doc Code: TR.PROV

Document Description: Provisional Cover Sheet (SB16)

PTO/SB/16 (04-07)

Approved for use through 06/30/2010 OMB 0651-0032

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Inventor(s)

Inventor 1

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Given Name	Middle Name	Family Name	City	State	Country
Nigel	M.	Grech	Fresno	CA	US

All Inventors Must Be Listed – Additional Inventor Information blocks may be generated within this form by selecting the **Add** button.

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Title of Invention	Post Harvest Treatment of Fruit
Attorney Docket Number (if applicable)	10922.00

Correspondence Address

Direct all correspondence to (select one):

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Customer Number 25265

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

☒ No.

☐ Yes, the name of the U.S. Government agency and the Government contract number are:

Entity Status

Applicant claims small entity status under 37 CFR 1.27

☒ Yes, applicant qualifies for small entity status under 37 CFR 1.27☐ No**Warning**

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Signature	/Mark D. Miller/			Date (YYYY-MM-DD)	Mar 7, 2008
First Name	Mark	Last Name	Miller	Registration Number (If appropriate)	32277

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Post Harvest Treatment of Fruit

Abstract

Methods for protecting fruit and vegetables against post harvest microbial decay by applying systemic acquired resistance inducers in combination with sorbic acid or its alkali metal salts.

Description

This invention relates to protecting fruit and vegetables against attack by decay-causing organisms, particularly by fungi.

It is a well-known practice in fruit and vegetable processing to apply anti microbial agents to the surface of freshly harvested fruit and vegetables for the purpose of controlling decay-causing organisms.

Systemic resistance inducers are known to elicit microbial resistance in plants but are not used in post harvest applications in fruit and vegetables because they do not provide control of microorganisms at an acceptable level.

Sorbates are known to impart some degree of protection against microbial decomposition in fruit and vegetables but not at an acceptable commercial level when applied alone.

With increasing regulatory and environmental pressure being applied on the post harvest fruit and vegetable sectors, many antimicrobial materials are being withdrawn or not reregistered. This invention provides for a novel method of reducing microbial spoilage of fruit and vegetables utilizing materials that are of very low mammalian toxicity and are environmentally benign.

The invention is further illustrated by the following non-limiting examples.

EXAMPLE 1

Seven treatments comprising of 4 replications per treatment and each replicate comprising of 6 lemons.

Treatments were as follows:

- A, Fruit dipped in water. Untreated uninoculated control .
- B, Fruit dipped in water. Untreated inoculated control.
- C, Fruit immersed in a 2%w/w Potassium sorbate solution for 2 minutes.
- D, Fruit immersed in a 2%w/w potassium phosphite solution for two minutes.
- E, Fruit immersed in a mixture of 2%w/w Potassium sorbate solution and 2%w/w potassium phosphite solution, for two minutes.
- F, Fruit immersed in a mixture of 2%w/w Potassium sorbate solution and 2%w/w potassium phosphite solution, for two minutes.
- G, Fruit immersed in a mixture of 3%w/w Potassium sorbate solution and 3%w/w potassium phosphite solution, for two minutes.

After the treatments were applied and left to dry for 10 minutes, treatments B through G were inoculated with a mixed inocula of Green mold (*P. digitatum*) and Blue mold (*P. italicum*). Fruit inoculation was performed by piercing the fruit skin to a depth of 3-5 mm with a needle coated with spores from both fungi. Fruit was incubated at 25 C and decay development measured over 7 days from inoculation.

This experiment was repeated twice.

EXAMPLE 2

Seven treatments comprising of 4 replications per treatment and each replicate comprising of 6 Navel oranges.

Treatments were as follows:

- A, Fruit dipped in water. Untreated uninoculated control .
- B, Fruit dipped in water. Untreated inoculated control.
- C, Fruit immersed in a 2%w/w Potassium sorbate solution for 2 minutes.
- D, Fruit immersed in a 2%w/w potassium phosphite solution for two minutes.
- E, Fruit immersed in a mixture of 2%w/w Potassium sorbate solution and 2%w/w potassium phosphite solution, for two minutes.
- F, Fruit immersed in a mixture of 2%w/w Potassium sorbate solution and 2%w/w potassium phosphite solution, for two minutes.
- G, Fruit immersed in a mixture of 3%w/w Potassium sorbate solution and 3%w/w potassium phosphite solution, for two minutes.

After the treatments were applied and left to dry for 10 minutes, treatments B through G were inoculated with a mixed inocula of Green mold(*P. digitatum*) and Blue mold(*P. italicum*). Fruit inoculation was performed by piercing the fruit skin to a depth of 3-5 mm with a needle coated with spores from both fungi. Fruit was incubated at 25 C and decay development measured over 7 days from inoculation.

This experiment was repeated twice.

EXAMPLE 3

Seven treatments comprising of 4 replications per treatment and each replicate comprising of 6 lemons.

Treatments were as follows:

- A, Fruit dipped in water. Untreated uninoculated control .
- B, Fruit dipped in water. Untreated inoculated control.
- C, Fruit immersed in a 2%w/w Potassium sorbate solution for 2 minutes.
- D, Fruit immersed in a 2%w/w potassium phosphite solution for two minutes.
- E, Fruit immersed in a mixture of 2%w/w Potassium sorbate solution and 2%w/w potassium phosphite solution, for two minutes.
- F, Fruit immersed in a mixture of 2%w/w Potassium sorbate solution and 2%w/w potassium phosphite solution, for two minutes.
- G, Fruit immersed in a mixture of 3%w/w Potassium sorbate solution and 3%w/w potassium phosphite solution, for two minutes.

After the treatments were applied and left to dry for 10 minutes, treatments B through G were inoculated with a 5 mm diameter mycelia plug of *Geotrichium candidum* the causal agent of sour rot. Fruit inoculation was performed by removing a 5mm plug of skin, inserting the mycelia plug of *G.candidum* and replacing the fruit plug in the fruit. Fruit was incubated at 25 C and decay development measured over 7 days from inoculation.

This experiment was repeated twice.

EXAMPLE 4

Seven treatments comprising of 4 replications per treatment and each replicate comprising of 6 firm but ripe tomatoes.

Treatments were as follows:

- A, Fruit dipped in water. Untreated uninoculated control .
- B, Fruit dipped in water. Untreated inoculated control.
- C, Fruit immersed in a 2%w/w Potassium sorbate solution for 2 minutes.
- D, Fruit immersed in a 2%w/w potassium phosphite solution for two minutes.
- E, Fruit immersed in a mixture of 1%w/w Potassium sorbate solution and 1%w/w potassium phosphite solution, for two minutes.
- F, Fruit immersed in a mixture of 2%w/w Potassium sorbate solution and 2%w/w potassium phosphite solution, for two minutes.
- G, Fruit immersed in a mixture of 3%w/w Potassium sorbate solution and 3%w/w potassium phosphite solution, for two minutes.

After the treatments were applied and left to dry for 10 minutes, treatments B through G were inoculated with a 5 mm diameter mycelia plug of *Geotrichium candidum* the causal agent of sour rot. Fruit inoculation was performed by removing a 5mm plug of skin, inserting the mycelia plug of *G.candidum* and replacing the fruit plug in the fruit. Fruit was incubated at 25 C and decay development measured over 7 days from inoculation.

This experiment was repeated twice.

Results:

Example 1 (mean of two experiments)

Treatment	Lesion diameter(mm) day 7	% change from inoculated control
A	0	-
B	33	-
C	16	-51
D	12	-63
E	8	-75
F	12	-63
G	4	-87

Example 2(mean of two experiments)

Treatment	Lesion diameter(mm) day 7	% change from inoculated control
A	0	-
B	47	-
C	28	-40
D	24	-48
E	9	-81
F	11	-78
G	7	-89

Example 3(mean of two experiments)

Treatment	Lesion diameter(mm) day 7	% change from inoculated control
A	0	-
B	51	-
C	39	-24
D	28	-45
E	15	-70
F	10	-80
G	12	-77

Example 4(mean of two experiments)

Treatment	Lesion diameter day 7	% change from inoculated control
A	0	-
B	68	-
C	43	-37
D	40	-42
E	12	-83
F	6	-92
G	9	-88

Figure 1. Uninoculated Control

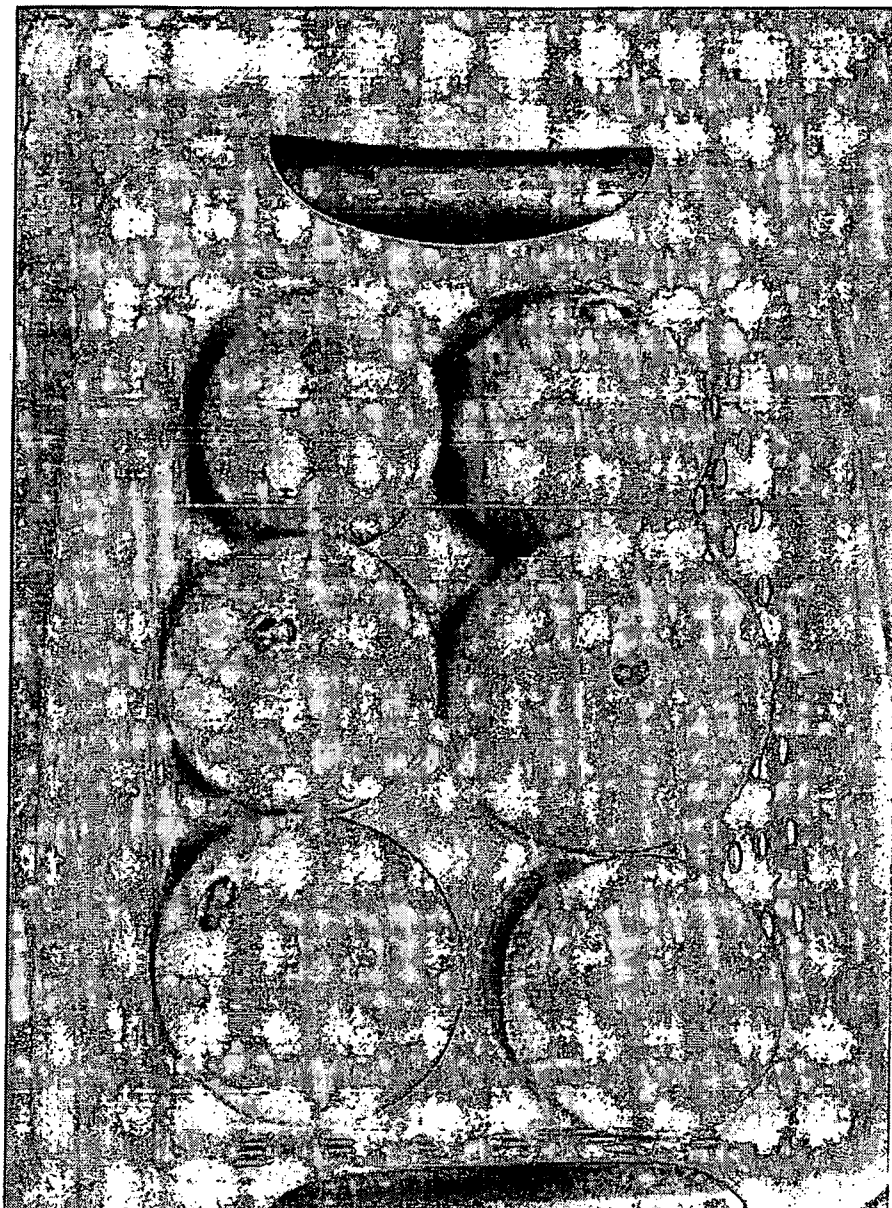


Fig. 2 Inoculated control with Blue and green mold day 4.

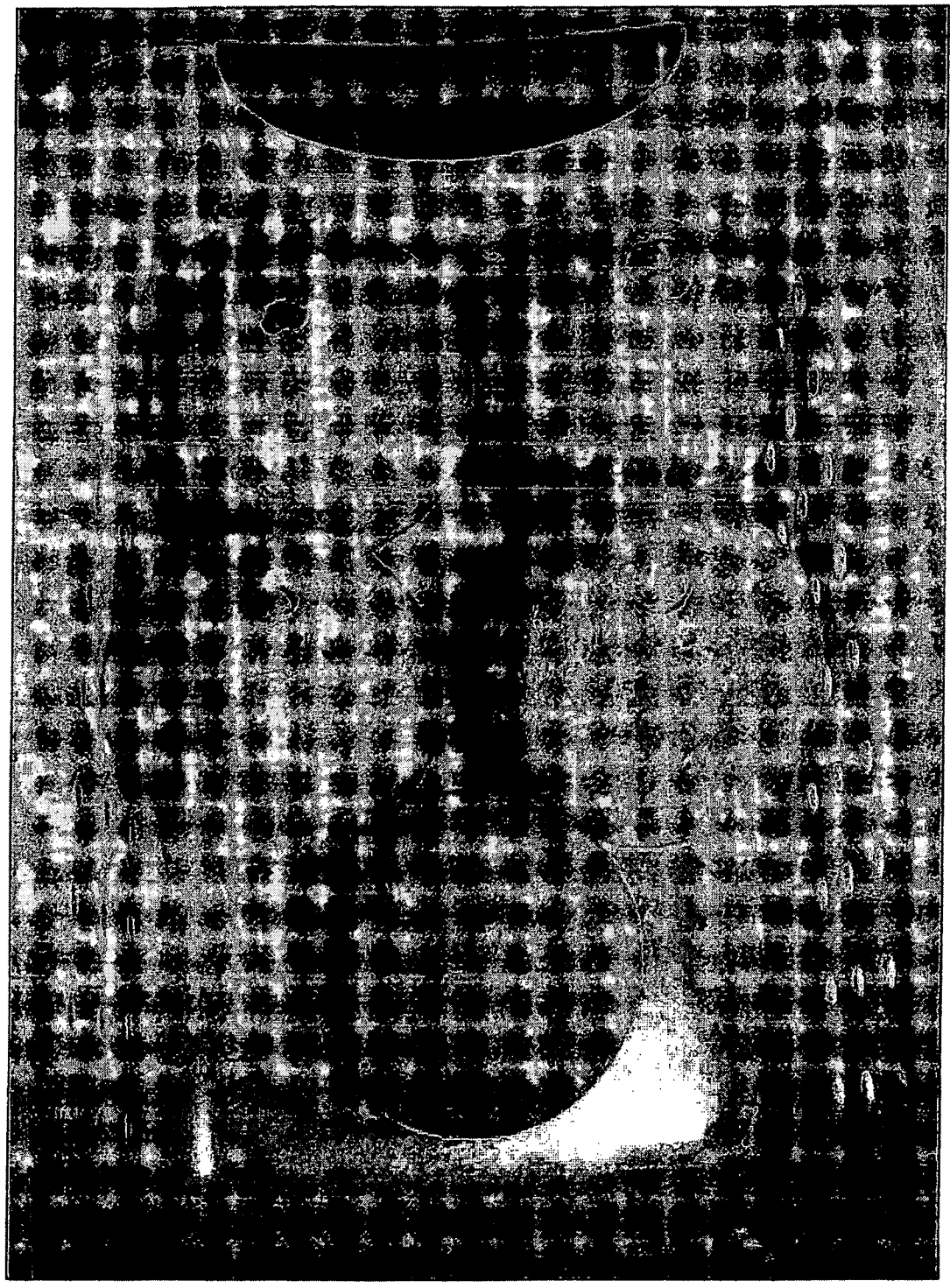


Fig.3 Inoculated control with Blue and Green mold day 7



Fig 4. Treatment F, 2% + 2%

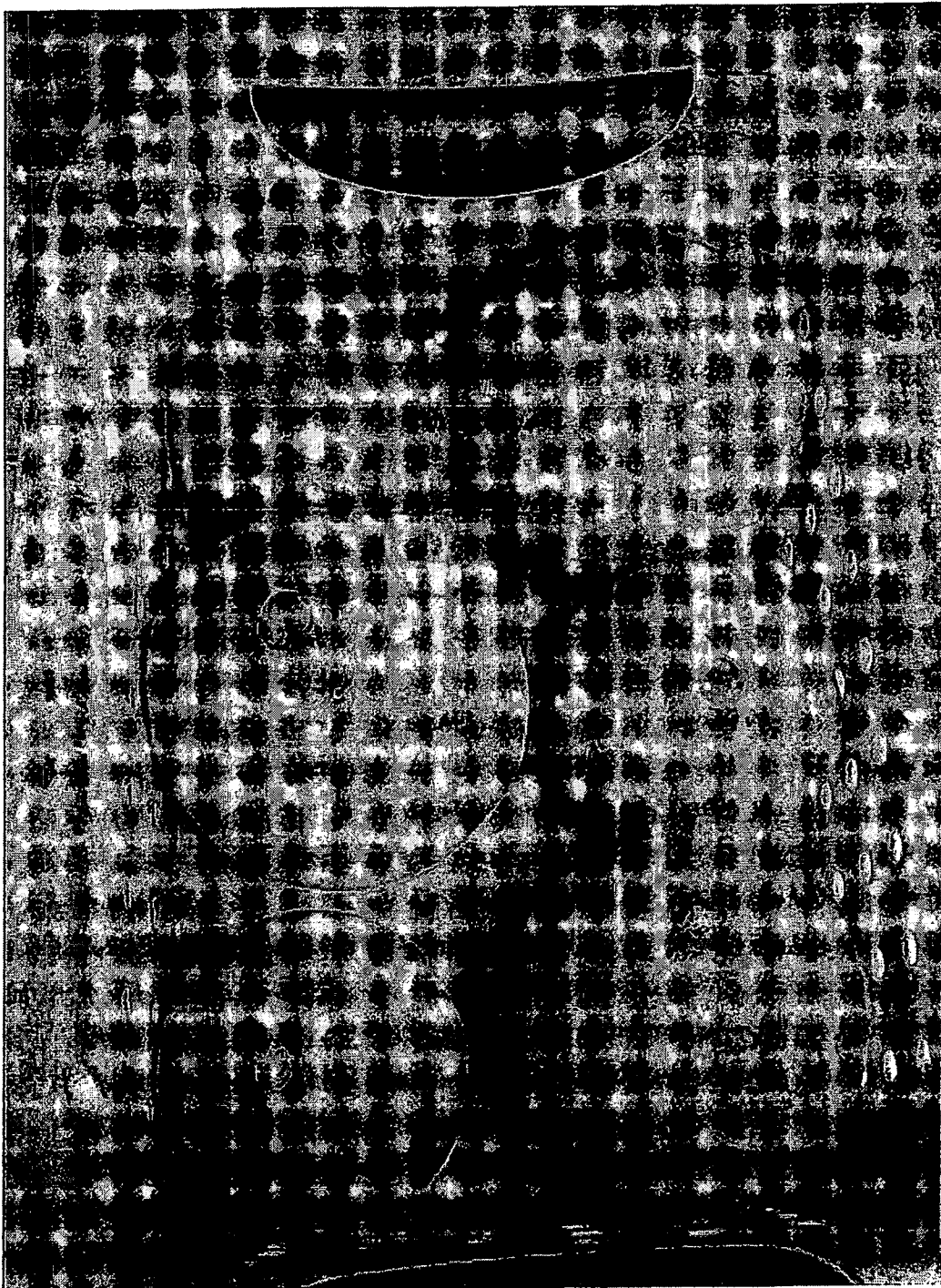
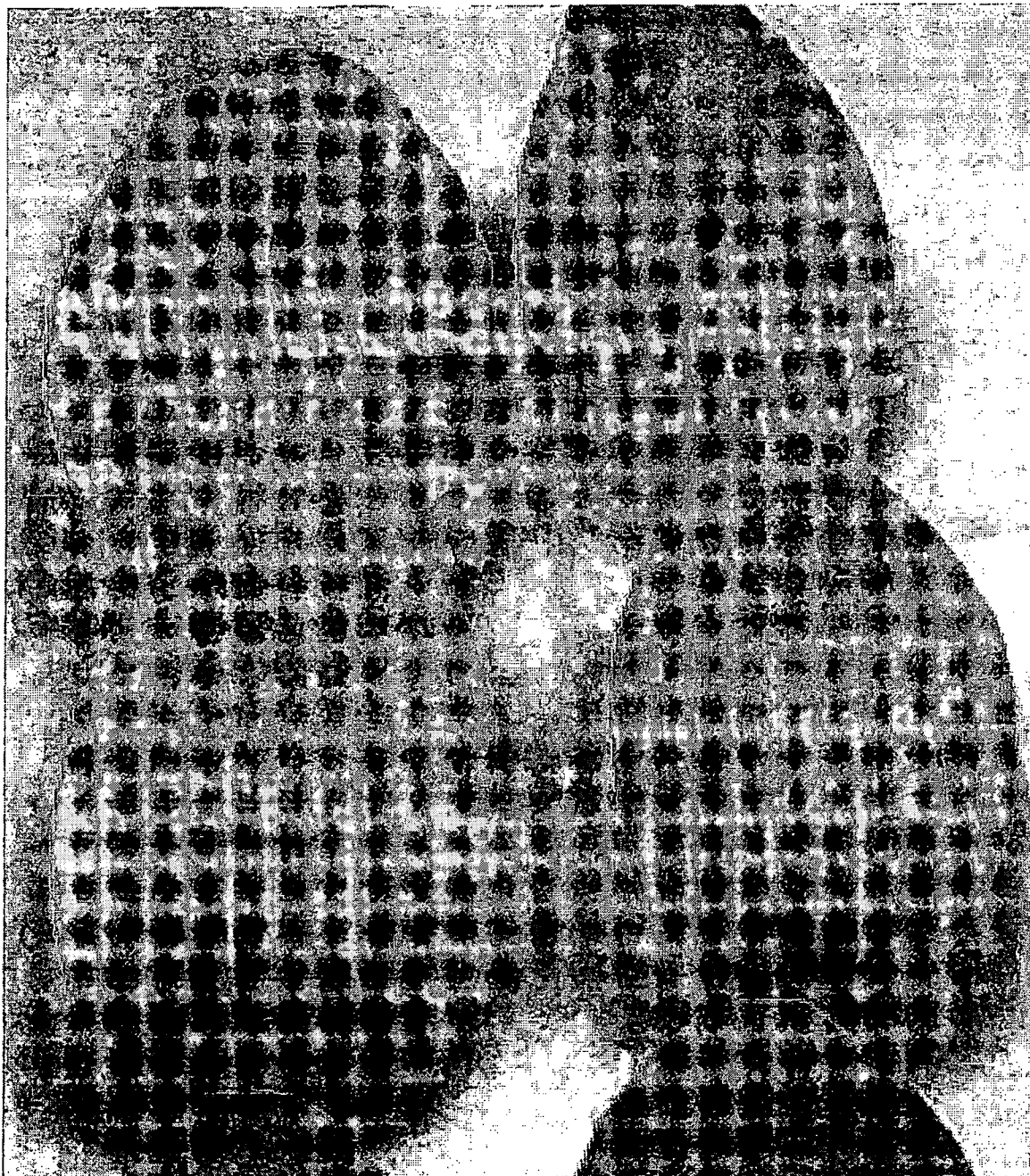


Fig. 5 Inoculated Lemons with Sour rot



Claims

I claim:

1. A method of protecting fruit or vegetables against post harvest microbial spoilage by applying mixtures of systemic resistance inducers in combination with sorbic acid and/or its alkali metal salts.
2. The method of claim 1 comprising the steps of preparing a composition comprising an aqueous solution of sorbic acid and/or its alkali metal salts in a concentration range of about 0.1% and about 10% w/w in combination with a solution of phosphorous acid and/or its alkali metal salts in a concentration of about 0.1% to about 10% w/w.
3. The method of claim 2 wherein the optimal concentration ranges of each of the two ingredients in aqueous solution is about 1-3 %.
4. A method of protecting fruit or vegetables against post harvest microbial spoilage wherein fruits or vegetables are immersed in the compositions of claims 2 or 3 for between about 5 seconds and about 10 minutes.
5. The method of claim 5 wherein the optimal immersion time is about 1-3 minutes.
6. The method of claims 2 or 3 wherein the fruit or vegetable is drenched or sprayed with the composition.
7. A method of protecting fruit or vegetables against post harvest microbial spoilage comprising the steps of preparing a composition comprising of mixing sorbic acid and/or its alkali metal salts at a concentration range between about 0.1% and about 10% w/w in combination with phosphorous acid and/or its alkali metal salts in the

concentration range of between about 0.1% and about 10% w/w into wax coatings and applying the said composition to fruit or vegetables.

8. The method of claim 7 wherein the optimal composition of each of the components in the composition is in the range of about 4-8% .

9. The method of claims 2 or 7, wherein the composition can be applied to fruit or vegetables in combination with conventional post harvest chemicals such as fungicides and biocides.

10. A composition comprising a stable concentrated formulated product in a liquid or solid state made from an aqueous solution of sorbic acid and/or its alkali metal salts in a concentration range of about 0.1% and about 10% w/w in combination with a solution of phosphorous acid and/or its alkali metal salts in a concentration of about 0.1% to about 10% w/w.

Inventors: Nigel M. Grech(Fresno, CA)

Assignee:

Appl. No.:

Filed:

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PA 1744194

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16 de Marzo de 2009

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NÚMERO DE SOLICITUD: *61/034,881*

FECHA DE SOLICITUD: *7 de marzo de 2008.*

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Por la autoridad del

Subsecretario de Comercio para la Propiedad Intelectual y Director de la Oficina de Patentes y Marcas de los Estados Unidos

66

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Consta:

Una (1) oblea dorada con el siguiente texto: OFICINA DE PATENTES Y MARCAS DE
LOS ESTADOS UNIDOS – DEPARTAMENTO DE COMERCIO.

REIVINDICACIONES

Reivindico

1. Un método para proteger frutas u hortalizas contra la descomposición microbiana post-cosecha mediante la aplicación de una mezcla compuesta inductores de resistencia sistémica en combinación con ácido sórbico y/o sus sales alcalinas metálicas
2. El método de la reivindicación 1 comprende los pasos para preparar una composición compuesta por una solución acuosa de ácido sórbico y/o sus sales alcalinas metálicas en un rango de concentración de aproximadamente 0,1 % y aproximadamente el 10% W/W, en combinación con una solución ácido fosfórico y/o sus sales alcalinas metálicas en una concentración de entre aproximadamente 0,1 % y aproximadamente el 10% W/W.
3. El método de la reivindicación 2 en el cual los rangos de concentración óptima de cada uno de los dos ingredientes en la solución acuosa es de aproximadamente 1-3%.
4. Un método para proteger frutas u hortalizas frente a descomposición microbiana post-cosecha en el cual los frutos u hortalizas están sumergidas en las composiciones de las reivindicaciones 2 o 3 por un intervalo de tiempo de entre unos 5 segundos y unos 10 minutos.
5. El método de la reivindicación 5 en el cual el tiempo de inmersión óptimo es de aproximadamente 1-3 minutos.
6. El método de las reivindicaciones 2 y 3 en el cual la fruta u hortaliza es empapada o rociada con la composición.
7. Un método para proteger frutas u hortalizas contra la descomposición microbiana post-cosecha que comprende los pasos para preparar una composición compuesta de mezclar ácido sórbico y/o sus sales alcalinas metálicas cen un rango de concentración que está entre aproximadamente 0,1% y aproximadamente 10% W/W en combinación con ácido fosfórico y/o sus sales metálicas alcalinas en un rango de concentración de entre aproximadamente 0,1% y aproximadamente 10% W/W en recubrimientos de cera y aplicando dicha composición a las frutas u hortalizas.

8. El método de la reivindicación 7 en el cual la composición óptima de cada componente en la composición esta en el rango de aproximadamente 4-8%.

9. El método de las reivindicaciones 2 o 7, en el cual la composición puede ser aplicada a la fruta u hortaliza en combinación con químicos post-cosecha tales como fungicidas y biocidas.

10. Una composición que comprende un producto formulado concentrado estable en estado líquido o sólido hecho de una solución acuosa de ácido sórbico y/o sus sales alcalinas metálicas en un rango de concentración de entre alrededor de 0,1% y aproximadamente el 10% W/W en combinación con una solución de ácido fosfórico y/o sus sales metálicas alcalinas en una concentración de entre alrededor de 0,1% y aproximadamente el 10% W/W.